GREGORY NEWMAN

EXPERIENCE:

Dr. Gregory Newman is a Senior Scientist at Lawrence Berkeley National Laboratory, Earth Science Division and Head of the Geophysics Department in the Earth Sciences Division. Prior to his appointment in January 2004, Dr. Newman worked nearly fourteen years at Sandia National Laboratories, Geophysical Technology Department. His interest, include large-scale, multi-dimensional, inverse and forward modeling problems arising in exploration geophysics, parallel computation and electromagnetic geophysics. He has over 20 years of experience in large-scale geophysical field simulation and computation. In 2000, Dr Newman was a Mercator Fellow at the Institute for Geophysics and Meteorology, University of Cologne, Federal Republic of Germany. The fellowship was awarded from the German National Science Foundation for a year of study in the Federal Republic of Germany. Studies at the Institute were directed on the formulation and implementation of 3D transient electromagnetic modeling and inversion algorithms for geophysical applications and lectures on the electromagnetic modeling and inversion. Dr. Newman was also affiliated with this institution from 1987-1989 as a Post Doctorate Appointee and an Alexander von Humboldt Fellow.

Senior Scientist & Geophysics Department Head, *Earth Sciences Division* Lawrence Berkeley Laboratory; 2004-2009
Webpage URL: http://esd.lbl.gov/people/ganewman/homepage/index.html

Distinguished Member Technical Staff, *Geophysical Technology Department*, Sandia National Laboratories; 2001-2004

Principal Member Technical Staff, *Geophysical Technology Department* Sandia National Laboratories; 1990-2000

EDUCATION:

University of California, Riverside, 1980 BS, Geophysics
University of Utah, Salt Lake City, 1983 MS, Geophysics
University of Utah, Salt Lake City, 1987 Ph.D, Geophysics

The Title of Ph.D. dissertation: Three-dimensional Transient Electromagnetic Modeling for Exploration Geophysics. Thesis Advisor – Professor Gerald W. Hohmann

POST DOCTORATE ADVISOR:

David Alumbaugh, Sandia National Laboratories, 1993-1995
Chester Weiss, Sandia National Laboratories, 1999-2000
Michael Commer, 2004-2006, Lawrence Berkeley National Laboratories

TEACHING EXPERIENCE:

Organized and lectured on the theory of geophysical inverse problems. Course was given at the University of New Mexico, Physics and Astronomy Department in the Spring semester of 2002.

Organized and lectured on numerical methods for 3D Electromagnetic modeling. Course was given at the Institute for Geophysics and Metrology, University of Cologne, Federal Republic of Germany. Course was given in the Spring semester 2000.

Organized and lectured on numerical strategies for 3D/2D large-scale electromagnetic inverse problems. Course was given at the Institute for Geophysics and Metrology, University of Cologne, Federal Republic of German in the Fall semester 2000.

Jointly organized and lectured on electromagnetic geophysics for hydrology. Course was given in the Fall quarter of 1996 at the New Mexico Institute of Mining Technology, Socorro New Mexico.

Organized special Short Course on 3-D Electromagnetic Modeling given at the Helsinki University of Technology, Department of Materials Science and Rock Engineering, Espoo Finland, Summer 1991.

SOCIETY AFFILIATIONS:

Member, Society of Exploration Geophysics
Member, American Geophysical Union

HONORS & AWARDS:

R&D 100 Award: 2009, EMGeo: Electromagnetic Geological Mapper; 3D Imaging software for large scale data sets and imaging volumes that arise in hydrocarbon exploration.

Invited Speaker: 2008, III Brazilian Geophysical Symposium, Belem and National Observatory, Rio de Janeiro, Brazil.

Invited Speaker: 2008, Geophysical Workshop on 3D Magnetotelluric Inversion, Dublin Institute for Advanced Studies, Dublin, Ireland.

Elected Member to the **Electromagnetics Academy**, 2007. The Academy is devoted to academic excellence and the advancement of research and relevant applications of the electromagnetic theory and to promoting educational objectives of the electromagnetics profession. Induction to Membership in the Academy is an honor in recognition of scholarly achievements and distinguished educational and professional services.

Technology Transfer Award, Lawrence Berkeley National Laboratory, 2005.

Mercator Fellow, Institute for Geophysics and Meteorology, University of Cologne, Federal Republic of Germany, 2000-2001.

Invited Speaker: Special workshop on Bridging the Gap between Research and Practice; Electromagnetic Workshop – Numerical methods: SAGEEP'94, March 31, Boston MA, 1994.

Invited Lecturer: Special Short Course on 3-D Electromagnetic Modeling given at the Helsinki University of Technology, Department of Materials Science and Rock Engineering, Espoo Finland, Summer 1991.

CSIR Fellow: Recipient of a Federal Research and Development Fellowship, Republic of South Africa, Winter 1990.

Invited Visiting Scientist: Russian Academy of Sciences, Division Physics of the Earth, Moscow, USSR. Fall, 1988.

Alexander von Humboldt Fellow, Institute for Geophysics and Meteorology, University of Cologne, Federal Republic of Germany, 1987-1989.

Distinguished Doctoral Degree Research Award, University of Utah, Department of Geology and Geophysics, 1986-1987.

PROFESSIONAL SERVICE:

January 2008: Scientific Impacts and Opportunities in Petaflop Computing; Contributor to Office of Science Report on high performance computational opportunities in the Earth Sciences.

2001 – 2002: Associate Editor of Electromagnetic Methods for Geophysical Prospecting.

June 1999 to 2001: Member of the Program Advisory Committee (PAC) for National Energy Research Scientific Computing Center **(**NERSC**)**. Duties involve recommending allocations to NERSC supercomputing resources in geosciences for the DOE Office of Science.

1995 – 1999: Associate Editor of Electromagnetic Methods for Geophysics.

January 1996: United States Department of Energy Advanced Computational Technology Initiative Program for Earth Sciences, Review Board Panel Member.

TECHNICAL SESSION ORGANIZATION:

Organizer of the Electromagnetic Technical Session: Large-scale 3D electromagnetic inverse problems in geophysics. Progress in Electromagnetics Research Symposium (PIERS), 2008, Cambridge, MA.

Organizer of the Electromagnetic Technical Sessions: Society of Exploration Geophysicists 67th Annual Meeting, Dallas Texas, November 2-7, 1997.

Co-organizer of the Workshop, "The Role of In-Mine Geophysics for Resource Evaluation": Annual Meeting of the Society of Exploration Geophysicists, Denver Co, 1996.

RESEARCH FUNDING HISTORY:

Office Basic Energy Sciences, 1992-2009, $3,425,000
Sandia Laboratory Directed Research and Development, 1993-2003, $2,000,000
Department of Energy Fossil Program Office, 2001-2005, $1,250,000
Department of Energy Geothermal Program Office, 2003-2006, $750,000
ExxonMobil Corporation, 2004-2008, $1,100,000
Statoil, 2006-2008, $270,000

TECHNOLOGY TRANSFER:

Software Licensing Activities, 1995-2009, licensing generated royalties, $2,610,000. Companies include British Petroleum, BHP Billiton, Chevron Corporation, ConcoPhillips, Electromagnetic Instruments, ENI S.p.A, ExxonMobil, Halliburton Energy Services, Noranda, OHM LTD, Schlumberger, Shell International Exploration and Production, Statoil, Stolar.

PUBLICATIONS:

Newman, G. A., Wannamaker, P. E., and Hohmann, G. W., 1985, On the detectability of crustal magma chambers using the magnetotelluric method: Geophysics, **50**, 1136-1143.

Anderson, W. L., and Newman, G. A., 1985, An album of three-dimensional transient electromagnetic responses for the central-induction loop configuration: U.S. Geol. Sur. Open-File Rept. **85-745**.

Newman, G. A., Hohmann, G. W., and Anderson, W. L., 1986, Transient electromagnetic response of a three **51**, 1608

Gunderson, B. M., Newman, G. A., and Hohmann, G. W., 1986, Three-dimensional transient electromagnetic responses for the grounded wire source: Geophysics, **51**, 2117-2130.

Newman, G. A., Anderson, W. L., and Hohmann, G. W., 1987, Interpretation of three dimensional transient electromagnetic soundings for the central loop configuration: Geophys. J. R. astr. Soc., **89**, 889-914.

Newman, G. A., and Hohmann, G. W., 1988, Transient electromagnetic responses of high contrast prisms in a layered earth: Geophysics, **53**, 691-706.

Newman, G. A., Anderson, W. L., and Hohmann, G. W., 1989, Electromagnetic borehole responses of three dimensional bodies in a conductive host: Geophysics, **54**, 598-608.

Newman, G. A., 1989, Deep transient electromagnetic soundings with a grounded source over near surface conductors: Geophysical Journal, **98**, 587-601.

Flis, M. F., Newman, G. A., and Hohmann, G. W., 1989, Induced polarization effects in time-domain electromagnetic measurements: Geophysics, **54**, 514-523.

Hohmann, G. W., and Newman, G. A., 1990, Transient electromagnetic responses of surficial, polarizable patches: Geophysics, **55**, 1098-1100.

Newman, G. A., 1994, A study of downhole electromagnetic sources for mapping enhanced oil recovery processes: Geophysics, **59**, 534-545.

Newman, G. A., 1995, Cross well electromagnetic inversion using integral and differential equations: Geophysics, **60**, 899-911.

Newman, G. A., and Alumbaugh, D. L., 1995, Frequency domain modeling of airborne electromagnetic responses using staggered finite differences: Geophysical Prospecting, **43**, 1021-1042.

Peltoniemi M., Bars R. and Newman G. A., 1996, Numerical modeling of airborne electromagnetic anomalies originating from low-conductivity 3D bodies: Geophysical Prospecting, **44**, 55-69.

Alumbaugh, D. L. , Newman, G. A., Prevost, L., and Shadid, J.N., 1996, Three dimensional, wideband electromagnetic modeling on massively parallel computers; Radio Science, **31**, 1-23.

Newman, G. A., and Alumbaugh, D. L., 1997, 3-D massively parallel electromagnetic inversion -- Part I. Theory; Geophysical Journal International, **128**, 345-354.

Alumbaugh, D. L., and Newman, G. A., 1997, 3-D massively parallel electromagnetic inversion -- Part II. Analysis of a crosswell experiment: Geophysical Journal International, **128**, 355-363

Avdeev, D., Kuvshinov, A. V., Pankratov, O. V., and Newman G. A., 1997, High performance three-dimensional electromagnetic modeling using a modified Neumann series. Wide-band numerical solution and examples: Journal of Geomagnetism and Geoelectricity, **49**, 1519-1539.

Avdeev, D., Kuvshinov, A. V., Pankratov, O. V., and Newman G. A., 1998, Three-dimensional frequency-domain modeling of airborne electromagnetic responses: Exploration Geophysics, **29**, 1-9.

Newman, G.A., and Alumbaugh, D.A., 1999, 3-D electromagnetic modeling and inversion on massively parallel computers, in Oristaglio, M.N., and Spies, B.R., ed., Three-Dimensional Electromagnetics: Society of Exploration Geophysicists, Geophysical Developments No. 7, Tulsa OK, 299-321.

Newman G. A. and Alumbaugh D. L., 2000, Three-dimensional magnetotelluric inversion using non-linear conjugate gradients: Geophysical Journal International, **140**, 410-424.

Alumbaugh D. L. and Newman G. A., 2000, Image Appraisal for 2D and 3D Electromagnetic Inversion: Geophysics, **65**, 1455-1467.

Newman G. A., and Hoversten G. M., 2000, Solution strategies for 2D and 3D electromagnetic inverse problems: Inverse Problems, **16**, 1357-1375.

Zhang Z., Routh P. S., Oldenburg D. W., Alumbaugh D. L., and Newman G. A., 2000, Reconstruction of 1-D conductivity from dual-loop EM data: Geophysics, **65**, 492-501.

Hoversten. G. M., Newman G. A., Morrison H. F., Gasperikova, E. and Berg John-Inge, 2001, Reservoir characterization using crosswell EM inversion: A feasibility study for the Snorre Field, North Sea: Geophysics, **66**, 1177-1189.

Badea, E.A., Everett, M.E., Newman, G.A. and Biro, O., 2001, Finite-element analysis of controlled-source electromagnetic induction using Coulomb-gauged potentials: Geophysics, **66,** 786-799.

Weiss, C. J. and Newman, G. A., 2002, Electromagnetic induction in a fully 3-D anisotropic earth: Geophysics, **67,** 1104-1114.

Newman, G. A., Hoversten G. M., and Alumbaugh, D. L., 2002, 3D magnetotulleric modeling and inversion: applications to sub-salt imaging: in Three-Dimensional Electromagnetics, Proceedings of the Second International Symposium, Chapter 8, 127-152, Elsevier.

Newman, G.A. and Alumbaugh, D.L., 2002, Three-dimensional induction logging problems, Part 2: A finite-difference solution: Geophysics, **67,** 484-491.

Avdeev, D.B., Kuvshinov, A.V., Pankratov, O.V. and Newman, G.A., 2002, Three-dimensional induction logging problems, Part I: An integral equation solution and model comparisons: Geophysics, **67,** 413-426.

Weiss, C.J. and Newman, G. A., 2003, Electromagnetic induction in a generalized 3D anisotropic earth, Part 2: The LIN preconditioner: Geophysics, **68,** 922-930.

Newman, G. A., Recher, S., Tezkan, B. and Neubauer, F. M., 2003, 3D inversion of a scalar radio magnetotelluric field data set: Geophysics, **68,** 782-790.

Commer, M., and Newman, G., 2004, A parallel finite-difference approach for three-dimensional transient electromagnetic modeling with galvanic sources: Geophysics, **69**, 1192-1202.

Newman, G. A., and Boggs, P. T., 2004, Solution accelerators for large-scale three-dimensional electromagnetic inverse problems: Inverse Problems, **20**, S151-S170.

Newman, G. A., and Commer, M., 2005, New advances in transient electromagnetic inversion: Geophysical Journal International, **160**, 5-32.

Hoversten, G. M., Newman, G. A., Geier, N., Flanagan, G., 2006, 3D modeling of a deepwater EM exploration survey: Geophysics, **71**, No. 5, G239-G248.

Commer M., and Newman G. A., 2006, An accelerated time domain finite difference simulation scheme for three-dimensional transient electromagnetic modeling using geometric multigrid concepts: Radio Science, **41**, 1-15.

Hoversten, G. M., Cassassuce, F., Gasperikova, E., Newman, G. A., Chen, J., Rubin Y., Hou, Z., Vasco D., 2006, Direct reservoir parameter estimation using joint inversion of marine seismic AVA and CSEM data, Geophysics, **71**, No. 3, C1-C13.

Commer, M., Newman G. A., Carazzone, J. J., Dickens, T. A., Green, K. A., Wahrmund, L. A., and Willen, D. E., 2008, Massively-parallel electrical-conductivity imaging of hydrocarbons on the Blue Gene/L supercomputer: IBM Journal of Research and Development, **52**, No. ½.

Commer, M. and Newman G. A., 2008, New advances in controlled source electromagnetic inversion: Geophysical Journal International, **172**, 513-535.

Newman, G. A., Hoversten G. M., Wannamaker P. E., and Gasperikova, E., 2008, Three-dimensional Magnetotelluric Characterization of the Coso Geothermal Field; Geothermics, 37, 369-399.

Commer, M. and Newman G. A., 2009, Three-Dimensional Controlled-Source Electromagnetic and Magnetotelluric Joint Inversion: Geophysical Journal International, **178**, 1305-1316.

Newman, G. A. and Commer M., 2009, Massively Parallel Electrical Conductivity Imaging of the Subsurface: Journal of Physics: Conference Series **180**, 012063.

Newman, G. A., Commer M., and Carazzone J. J., 2009, Imaging CSEM Data in the Presence of Electrical Anisotropy: Geophysics, In Press.